

Q21 List the hormones secreted by the pituitary gland. (30% marks) Outline the physiological factors that control secretion of hormones from the posterior pituitary. (70% marks) (Sept 2009)

Hormones secreted from anterior pituitary:

- Follicle stimulating hormone FSH
- Luteinising hormone LH
- Adrenocorticotrophic hormone ACTH
- Prolactin
- Thyrotropin stimulating hormone TSH (thyrotropin)
- Growth hormone GH

Hormones secreted from the posterior pituitary:

- Vasopressin (Antidiuretic hormone ADH)
- Oxytocin

Posterior pituitary hormones control:

- Vasopressin:
 - Vasopressin secreting neurons lie in the supraoptic (SON) and paraventricular (PVN) hypothalamic nuclei.
 - Released in response to both osmolality and pressure changes:
 - Circumventricular organs in the 3rd and 4th ventricles act as osmoreceptors, sensing changes in plasma osmolality (normal range 275-290mOsmol/kg), and feeding back to the SON and PVN. Hyperosmolality is the most sensitive influence on ADH release (secreted in response to a 1-2% effective increase in plasma oncotic pressure, starting at 280mOsmol/kg)
 - Decreases in blood volume sensed by baroreceptors (both arterial high pressure and cardiopulmonary low pressure baroreceptors) will also affect ADH release. Impulses carried via the glossopharyngeal and vagal nerves synapse in the Nucleus of the Solitary Tract then transmit to the SON and PVN. Plasma ADH levels do not change appreciably until 10% reduction in plasma volume (BUT with further decreases, ADH secretion rises rapidly to a maximum rate at 25% loss of blood volume) – hence ADH important in severe decreases in blood volume). Hypovolaemia will cause ADH release even if plasma is hypotonic.
 - Lesser influences include nausea, nicotine and morphine, which increase ADH secretion, and alcohol which inhibits it
- Oxytocin:
 - Secreted by the hypothalamic SON and PVN, then diffuse directly down to the posterior pituitary
 - Released in response to touch receptors in the breast (particularly around the nipple), which relay impulses to the hypothalamic SON and PVN, causing secretion of oxytocin from the posterior pituitary. Oxytocin acts via G protein coupled receptors in human myometrium, mammary tissue and the ovary. Genital and emotional stimulation can also trigger oxytocin secretion in the lactating woman.
 - Oxytocin is also released during labour when it acts on the myometrium to increase uterine contractions.